International Journal of
Innovative Research in Social Sciences and Strategic Management Techniques
Hard Print: 2465-728X, Online Print: 2467-8155 Vol. 3, No. 1 April, 2016

Open - access JOURNAL

Private Sector Investment and Economic Growth in Nigeria: an Empirical Investigation of Non-Oil Investment (1980 – 2013)

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Abstract

Nigeria, with her vast mineral resources, favorable climate and vegetation has a very good potential to attract both domestic and foreign private investment for a sustainable economic growth, but yet, her investment output growth has remained volatile and sluggish. This study, examines the nature of relationship between private sector investment (non- oil) and Nigeria's economic growth using Nigerian time series for a period spanning1980 to 2013, applying Co-integration technique, Unit root test and Error Correction mechanism. The empirical result demonstrates that a long run positive and significant relationship exists between GDP and some selected private investment indicators namely: non-oil FDI, Gross capital formation and non-oil income output. However, the last two, though positive, are not significant, indicating in effective contribution to GDP. Credit to Private Sector, Government Capital expenditure and inflation are inversely and significantly related to GDP, implying no positive influence on GDP while inflation is a constraint to the benefits drivable from private investments in Nigeria. The speed of the equilibrium adjustment,(as indicated by the well-defined negative ECM coefficient) suggests policy lag effect and that GDP in Nigeria, tends to responds slowly to the disequilibrium tendencies in these private investment indicators in the long run. Based on these findings, the study recommends sustainable price stability, economic efficiency driven by infrastructural development and enhanced technological capabilities to encourage private sector production capacity. There is need for monetary and fiscal policy initiatives that will channel funds to the productive sector, increase the amount of credit to the private sector, maintain stable polity and economic reforms for promotion of foreign and domestic investment. Finally, policy makers should take cognizance of the lag effect and design policies inline with the expected magnitude of expected changes.

Keywords: *Private Sector Investment, Economic Development, Co-integration Test and Unit Root Test.*

Background to the Study

The effective management of an economy is critically dependent on the proper understanding of the interrelationships among the various components and sectors of the economy, as well as those factors that influence their dynamics. This is particularly relevant for economies that seek to move on the path of sustainable growth. It is also important in this regard, to bring to the front burner, those binding constraints to economic growth, which can only be effectively addressed, if policy makers can learn from the past experience.

Over the years, the Nigerian government under the new democratic dispensation has been in the fore front in growing the economy and among her cardinal economic objectives as a developing nation, is fostering sustainable economic growth. This is expected to enhance rapid economic development thereby reducing abject poverty. In pursuit of this objective, the Nigerian Monetary authorities have adopted (and are still pursuing) several reforms/policies, in line with neo-liberal thinking but the economy has continued to witness a low pace of growth and development. Many reasons have been advanced for this development but however, the most apparent has been the poor investment climate/output. This has been attributed to many factors which include: low level of investible funds (particularly to non-oil private sector), excessive Government capital expenditure that are in most cases not channeled to productive sector of the economy, credit to Government which are believed to be potentially crowding out credit to private sector, complex and inconsistent regulatory frameworks, macroeconomic instability, high lending rate, shortage of foreign exchange rate/depreciation, among others.

Investment has been identified as a major factor in economic growth and development, and by extension, contributes to high rate of employment, productivity, capital formation, improved technology and poverty reduction. It requires sound economic policies which would enhance domestic savings, foreign and domestic investments. For the government to achieve its desired economic objective of high growth and development, it must pursue policies that will increase both public and private sector investments. Although the prime motives of the two sectors are almost the same, they face the same challenges in financing and sustaining their investment requirements.

Some lessons of experience have shown that government alone cannot drive the economy. A paradigm shift, under the National Economic Empowerment and Development Strategy (NEEDS), has also underscored the need for public/private sectors partnership as well as restructuring the financial system for efficient growth of the economy. However, Nigeria and some other African countries have failed to create the enabling environment that would encourage both domestic and foreign private investment in sufficient quantities, capable of bringing about rapid economic growth and development. Comparing both slow and fast growing economies, Nigeria's investment/GDP ratio lags behind the required minimum level of an average of about 20.0 per cent of GDP annually that propelled the growth rate of those economies (World Bank, 1996). For instance, in the South East Asia countries, investment/GDP ratio is about 35 per cent in Singapore; 38 per cent in Korea, and 41 per cent each in Malaysia and Thailand. Chile in South America registered 28 per cent (World Bank 1998). This explains the growth rate of the Nigerian economy which closely followed the pattern of the growth rate of investment expenditure.

The ownership of Nigerian manufacturing sub-sector is shared between the public and private sectors of the economy. In terms of number, the private sector- owned manufacturing units are predominant, while public sector investments dominate the capital intensive heavy industries sub-sector. Publicly owned heavy industries accounted for 66.7 per cent of total investment in capital goods while 33.3 per cent is for the private sector, (UNDP, 1993). However, the recent privatization government programme had promoted the transfer of some of these firms to the private sector. Despite this development, Private sector investment in Nigeria still remains concentrated in the consumer good enterprises and had grown faster than the capital goods industries because of its relatively simple technology and lower capital investment which are sponsored by indigenous firms and to an extent, large foreign corporations. (Mordi et al, 2010).

Generally, Nigeria has been classified as a low domestic savings and even lower investment country. Despite her vast mineral resources, favorable climate and good vegetation features, her performance in terms of non-oil investment output, and ultimately economic growth, has remained quite unimpressive. Ajakaiye, (2002) and Nnanna,(2004).Nigerian economic climate was not able to attract private foreign investment to its fullest potentials, given the precarious operating environment which also limited domestic private investment when compared with other countries competing for global investment capital. For instance, cumulative foreign private investment received by the economy was N1.0 billion in 1970, N3.6 billion in 1980 andN157.5 billion in 2000. In 2008, it was N971.54 billion but went down to N905.73billion in 2009. It reached N1360.31billionin 2011 and in 2013, it went down slightly to N12786.70 billion. Although the amounts seem appreciable when expressed in domestic currency (Naira), it should be realized that the exchange rate of Naira has been suffering massive depreciation since 1986 up to date.(CBN, 2013).
Secondly, the Nigeria's dependency on oil as the main source of revenue and the persistent global oil glut, has adversely affected her revenue.

Furthermore, the problem of low return on investment are said to have risen, among other factors, from high cost of production which emanates directly or indirectly from macroeconomic instability, erratic fiscal and monetary policies, as well as her fragile financial system. Macroeconomic instability manifests in high and volatile rate of inflation, interest rates and high degree of volatility in exchange rates. This makes it more difficult to deduce the real return on investment from available market information. These problems apparently create dearth of long term projects, difficulty in forecasting and making investment decision, high rate of unemployment and abject poverty.(Motley, 1998 and Shiratsuka, 1997).
Thus, both domestic and foreign private investors are wary of investing in countries where basic requirements are inadequate and the return on investment is adversely affected. Consequently, to get out of this low-investment trap, it has become pertinent to examine the nature of relationship between economic growth and non-oil private sector investments in Nigeria as well as factors which scuttle the translation of investments into growth. The outcome will enhance economic planning for reasonable growth of investments and ultimately economic growth and development.

However, most of the economic scholars are of the view that the problems of Nigeria's private investment have not been well understood and thus, not well-managed. Some of the reviewed related studies like Nnanna et al (2004) as well as Green and Villanveva (1991), have some methodological and conceptual problems that undermine their accuracy and thus their efficacy for effective policy response. For instance, non- application of unit root test to reduce or if possible eliminate spurious regression due to non-stationary properties of time series, may lead to bias inferences. Engel and Granger (1987) and Gujarati (2009). Green and Villanveva also used cross-section analysis which precludes country's specifics which may also lead to misleading result.

Recognizing the above gaps and challenges of the previously reviewed studies, there is need to reexamine the problem holistically by applying Nigerian time series using modern analytical econometric techniques (Co-integration, Unit root test, Error Correction Mechanism (ECM) to see if a more authentic result could be achieved for effective economic planning.

The main objective of this study is therefore, to empirically examine the nature of relationship between economic growth and some selected private investment indicators and other factors that constrain investment output growth. This is the first step to solving the problem. To achieve this objective, the following hypothesis is formulated to aid the analysis: There is no significant long run relationship between economic growth, proxies by GDP and some selected and generally accepted non-oil Private Sector investment indicators namely: Gross capital formation, Foreign direct investment (non oil), Credit to private sector, Income Output (non-oil), Government capital expenditure, National Savings and inflation (constraint).

Review of Related Literature
Conceptual and Theoretical Issues
The term, Private investment, can be broadly defined as acquisition of an asset by non-public or non-governmental groups or individuals with the aim of receiving a positive return. It could also mean the production of capital goods, which are not consumed but instead used in future production. Investment is also usually measured in terms of physical capital formation, in which case, investment is regarded as an addition to the stock of capital. In other words, gross capital accumulation is the driving force of any national investment. (Stieglitz, 1993). At the macroeconomic level, investment expenditure in Nigeria in terms of financing is structured into domestic and foreign segments depending on sources of finance and to a lesser extent, management. At the domestic level, investment is further categorized into public and private sector investment expenditures. Foreign investment may also include foreign direct investment, foreign private investment and portfolio investments, whether such expenditure is financed by private or official sources of capital. Investment could also be evaluated from the sectorial distribution point of view, in which case, each group of activity sector of the Gross Domestic Product (GDP) is examined to measure the quantum of investment expenditure received over time. In this categorization, the structure of investment which is Gross Capital Formation is composed of building and construction, land development, transport, machinery and equipment and breeding stocks. (Nnanna et al, (2004) and Mordi et al (2010).

The gross national investment is comprised of public and private sector investments. The public or government sector investment is defined as comprising all units that implement public policy by providing non-market services, which is determined collectively through a decision making process and whose allocation is based according to the stressed needs of the final consumers. These units are financed mainly by compulsory levies and taxes on other sectors of the economy, Nnanna et al (2004). Due and Friedlander (1977) described public goods as possessing the basic characteristics of non-appropriate, non-rivalry, non-excludable consumption. Public goods are individually and collectively consumed such that the consumption of one individual does not reduce the amount available for others. These characteristics make it difficult to package public goods for sale under conditions of market mechanism. Examples are roads and highways, defense and national security, airport, environmental protection, etc. These characteristics of public goods render price mechanism ineffective in allocating resources efficiently in a market economy, thus providing rationale for public sector intervention in order to ensure efficient resource allocation, income redistribution, and attainment of stabilization of the economy.

This is in contrast to the private sector that engages in production and sale of private goods. Private goods are divisible and individually consumed, while consumers preference can be ascertained through effective demand. Consequently, private goods can be offered in markets and individuals that cannot pay for it are excluded from its consumption in the absence of effective demand. The motive for private investment is primarily for profit while public sector investment is geared at enhancing public interest, private investment and market system in order to promote synergy between government and private sector for economic growth and development, (Mordi et al 2010).

Theoretical framework for Understanding Economic Growth

Economic growth and development are two terms sometimes used interchangeably, but they differ in context. The apparent consensus suggests that economic growth refers to positive increase in the aggregate level of output within a given time period in a country while economic development is seen as an increase in the aggregate level of output and incomes with due consideration given to the quality of life that hopefully takes into consideration the distribution of income, healthcare, environmental degradation, global pollution, freedom and justice, etc.

Generally, economic development is a process by which an economy experiences three main phenomena namely: growth in output, structural changes and institutional changes. If the three phenomena take place, it will lead to a rise in standard of living of the populace. Hence growth could be enjoyed by many economies but not all experience development. The framework for understanding growth over the long-term is rooted in two main theories that relates to possible sources of growth. These are the growth theory and the growth accounting. Growth theory is concerned with the theoretical modeling of the interactions among growth of factor supplies, saving and capital formation, while growth accounting addresses the qualification of the contributions of the different determinants of growth. Lewis, (1978).

Three waves of interest have currently emerged in studying growth. The first wave is the linear-stages growth theory which is associated mainly with the work of Sir F. Harrods (1900-1978) and E. Domar (1914-1997) in what was termed the "Harrods–Domar Model" and that of Walt W Rostow's theory. Generally, the linear stages theory focused on lack of domestic savings and investment. The theory supports the view that economic growth could be achieved through industrialization. It attributed developing countries growth retardation to mainly low income and savings. The Harrods-Domar theory presupposed that growth depended on a country's savings rate, capital/output ratio, and capital depreciation. This theory has been criticized for three reasons. Firstly, it centers on the assumption of erogeneity for all key parameters. Secondly, it ignores technical change, and lastly, it does not allow for diminishing returns when one factor expands relative to another. Mordi et al, (2011). Rostow model equated economic growth with economic development. Given the low savings rate in developing economies, according to the theory, the government was responsible for creating and encouraging a class of people with propensity to save. Essien, (2001) aa well as Mordi et al (2011). The second began with the neoclassical (Solow) model, which contained the thinking that growth reflected technical progress and key inputs, (labour and capital). This school of thought is concerned with the efficient and cost effective allocation of resources and with optimal growth of those resources over time. They hold that countries develop economically via the market and that private markets, not government intervention, are critical for development experienced in the 1980s. The model allowed for diminishing returns, perfect competition but not externalities.

In the neoclassical growth process, savings were needed to increase capital stock, capital accumulation had limits to ensure diminishing marginal returns, and capital per unit of labour was limited. It postulates that growth also depended on population growth rate and that growth rate amongst countries was supposed to converge to a steady state in the long-run.. Despite the modifications, the basic problems associated with the neoclassical thinking are that it hardly explains the sources of technical change. (Romer 1986,) The third is the newer alternative growth theory, which entrances a diverse body of theoretical and empirical work that emerged in the 1980s. This is the endogenous growth model. It distinguished itself from the neoclassical growth model by emphasizing that economic growth was an outcome of an economic system, not the result of forces that impinged from outside. Its central idea was that the proximate causes of economic growth were the effort to economize, the accumulation of knowledge, and the accumulation of capital. According to this theory, anything that enhances economic efficiency is also good for growth. Thus the theoretical framework indigenized technological process through "learning by doing" or "innovation processes". It also introduced human capital, governance and institutions in the overall growth objectives (Romers,1994).

A number of endogenous growth theory referred to in the literature as non-Schumpeterian growth (Schumpeter emphasized the importance of temporary monopoly power as a motivating force in the innovative process). The model further incorporates the fact that technological advancement comes from what people do and existence of monopoly rents discoveries. The emphasis on knowledge and technology in the Schumpeterian model raises question about the role of government in promoting growth. Government should be seen as a critical agent that provides key intermediate inputs, establishes rules, and reduces

uncertainly, by creating the right macroeconomic environment for growth. (Contessi, 2009).

The newer growth theory (endogenous theory) fits the real world perfectly well and has important policy implications. This is because it traces growth of output per capita to two main sources: savings and efficiency. In other words it is not only factor accumulation that drives growth but also efforts to utilize them. An important economic policy implication of this thinking is that of achieving economic stability with low inflation and positive (real) interest rate that spurs saving, which is good for growth Gylfason, (2004) as well as Ford and Rock, (2008). Consequently, anything that increases efficiency and savings is good for growth.

Endogenous growth theory argues that policy measures can have an impact on the long-run growth rate of an economy, even if they do not change disaggregate saving rate. Thus, countries with high level of efficiency, appropriate economic system, sound, economic policy, tend to grow more rapidly (Romer, 1994). Rapid growth rates are associated with country with efficient economic system and prestige. (Lipsey, 1982 and Lewis, 1978). This new thinking is very important for countries in an integrated arrangement or considering forming an economic union, and therefore aptly explains why countries economic growths are different (Bawa and Essien 2005).

The efficiency argument is not entirely a new one. Economists have long held the view that technical change, an important catalyst for economic growth, is an aspect of general economic efficiency. It is said to be good for growth as to squeeze out more output from a given input and that is what efficiency is about. Conditions that cause efficiency are education, diversification, privatization, liberalization, stabilization, etc. (Gylfason, 2004). Education makes the labour force more efficient. Liberalization of prices and trade (trade openness) increases efficiency, stabilization reduces inefficiency associated with inflation, and privatization reduces inefficiency associated with government-owned enterprises. Romer 1986,

Accelerator Theory:
The accelerator theory basically postulates that investment is a linear function of changes in output. This investment is made possible by savings/income generation, in the sense that the savings/income generated is the money invested. However, a more general form of acceleration theory assumes that the larger the gap between the existing capital stock (infrastructure, human resources and physical assets) and the desired capital stock, the greater the country's required revenue to be generated and the required rate of investment. Some scholars posit that the accelerator theory performs well empirically, because time series evidence has always revealed that lags of output are highly correlated with investment and by extension, savings/income generated, Attalian (1990) and Ene (2004).

Furthermore, there are several motives for investment but the basic motive is profit/return. According to Keynes's theory, this motive depends on the expected marginal efficiency of capital in relation to the expected interest rate. The difference between the realized marginal efficiency of capital and rate of interest is the opportunity cost of investment. The theory assumes that expected return on investment is intrinsically volatile in view of the

uncertainty which accompanies the main determinants of investment returns. This is as far as private investment is concerned. In the context of growth, the accelerator principle suggests that increase in output lead to increase in investment, thus relating investment to GDP. It follows that demand for real asset machinery is a derived one. Investments depend on changes in final demand, and hence changes in GDP. In relation to this, the accelerator principle explains why a slowdown in growth of GDP leads to negative growth in subsequent period through a fall in investment spending. (Attalian (1990).

As a result of restrictive assumption of the accelerator model, Jorgenson (1967) as well as Hall and Jorgenson (1971) formulated the neoclassical approach. In this theory, the desired or optimal level of investment depends on the level of output and the user's cost of capital which in turn depends on price of capital goods, the rate of interest and the depreciation rate. The difference between the desired and current stock of capital is created by the lags in decision making and delivery, giving rise to the change of capital stock.

The deficiencies in this theory relate to the inconsistency of the assumptions of perfect competition and exogenously determined output. The assumption of static expectations about future prices, output and interest rates has also been found inappropriate. These necessitated the formulation of an alternative theory by Tobin (1969). The Tobin Q theory emphasizes the relationship between the increase in the value of the firm due to the installation of additional capital and its replacement cost. Investment, therefore, is a function of difference between the market value and the additional unit of capital and its replacement cost. This ratio (known as marginal (Q) may differ from unity due to delivery lags, adjustment and installation cost. However, the theory has been criticized on the following grounds: marginal and average Q will differ if firms enjoy economies of scale or market power; the assumption of increasing installation cost is unrealistic; the cost of additions to an individual firms capital stock is likely to be proportional or even less than proportional to the volume of investment, because of the indivisibility of many investment project..

On the other hand Arrow (1968) suggests that investment can be considered irreversible in an extreme situation. This implies that investment decisions can be viewed from the perspectives of irreversibility and reversibility.Under conditions of certainty, irreversibility creates a wedge between the cost of capital (interest rate) and its marginal contribution to profit, under condition of uncertainty due to macro instability (where irreversibility has important implications for investment decisions). Irreversible investment can be adversely affected by risk factor Bernanke (1983), as well as Bertola and Caballero (1990). This means that under uncertainty, firms acquiring additional capital presently stand the risk of being tuck with excess capacity in future and can be costly to eliminate. This notion amplifies the importance of uncertainty in investment decision making. The problem of uncertainty is more severe in developing countries where transformations inherent in development such as establishing new industries and absorption of new technologies and inflation heightens uncertainty (World Bank 1993).

Related Empirical Review

Financial constraints on investment are gaining prominence in the literature. Stiglitz and Weiss (1981) in their work concludes that at the micro level, firms may be facing binding financial constraints in domestic capital markets because interest rates are controlled or subjected to endogenous credit rationing by financial institutions. According to them, restrictive monetary and credit policies affect investment. They increase the real cost of retained earnings. Both mechanisms raise the user cost of capital and lead to reduction in investment.

Furthermore, Neoclassical investment theory asserts that investment led growth is feasible through increased factor accumulation. The major argument of the model is that it addresses the primary motive for private investment, which is to make profit. Recent empirical studies by Green and Villanveva (1991), have extended the neoclassical model by incorporating other considerations which include factors such as macroeconomic instability (inflation),macroeconomic policies (monetary, fiscal, and exchange rate), the incentive structure and response to it, risk and irreversibility, and credibility of policy reforms as major determinants of private investments. They concluded that risk plays a vital role in investment decision because it is irreversible. According to them, the decision to invest or postpone investment depends on the perception of the magnitude of risk by the investor..

In most developing economies, including Nigeria, risk arises from: interest rate structure, exchange rate volatility, high rate of inflation, macroeconomic instability and socio-political instability. Chadra and Sandilands 2002, using various concepts of investment such as private investment, government investment, total investment and fixed capital formation, to investigate the issue of casualty, came up with the basic conclusion that in India, capital accumulation is the result rather than the cause of growth. These findings suggest that policies aimed at increasing savings and investment should be vigorously pursued. They also suggest that available resources should be allowed to flow to sectors with greatest social returns, lowest prices and cost.

There is also well documented theoretical and empirical literature on the link between investment, finance and income output. All growth models have come to accept that the rate of growth of an economy is determined by the accumulation of physical and human capital, the efficiency of resources used and the ability to acquire and apply modern technology, (World Bank,1993 and Chenery,1961). In turn, finance is postulated as an important determinant of investment. It is argued that liberalization of financial markets leads to greater investment efficiency and mobilization of greater financial resources to finance investment. In Nigeria, banking system credits are not optimally channeled to productive investment. Thus, if finance facilitates investment and so for growth to take place, financial institutions must pool savings and then direct them to viable investments (Copeland Weston, 1980). This is the so called supply leading theory of finance. Consequently, the quality, cost and availability of loadable funds have constrained the expansion of investment in Nigeria. Nnanna et al (2004).

Chenery and Bruno, (1962), argue that when investment/GDP ratio consistently exceeded the Savings gap ratio, it implies that domestic savings was insufficient to fund the required investment. This is the savings-Gap model and it points to the need for external finance to supplement domestic resources.

Capital accumulation (investment) is regarded as the key to economic growth. Delong and Summers (1992 in their work observed the relationship between fixed capital formation (as percentage of GDP) and growth rate and conclude that the rate of capital formation determines the rate of a country's economic growth. However, a recent study by Blomstorm et al (1996) tested the causality between fixed investment and growth rate by using the Granger (1969) and Sims (1992) framework. They found that economic growth precedes capital formation and that there is no evidence of feedback. Similarly, Chadra and Sandilands (2002) using various concepts of investments such as private investment, government investment, total investment and fixed investment to investigate the issue of causality, came up with the basic conclusion that in India, capital accumulation is the result rather than the cause of growth. These findings suggest that policies aimed at increasing the rate of savings and investment should be vigorously pursued. They also suggest that available and adequate resources should be allowed to flow to sectors with the greatest social returns, lowest prices and cost.

Methodological Issues

Estimation Technique and Procedure

The study applied modern econometric analytical techniques - Co-integration, unit root test, Error correction mechanism (ECM) for the data analysis, with Nigerian time series data extracted from Central Bank of Nigeria(CBN) publications , spanning through 1980 to 2013. Prior to the co-integration test, the level series OLS regression was applied at first stage to test for long run relationship between Non-oil private investment and the selected explanatory variables. However, being conscious of the characteristics of the time series, we were careful about the properties of the stochastic error terms that might have entered the model which could give rise to spurious regression. Consequently, a further rigorous investigation was carried out using The Augmented Dickey Fuller(ADF) (1981) unit root test.

Unit Root Test

In line with recent development in time series modeling, unit root test is basically required to establish whether the time series have a stationary trend, and if non-stationary, to show the number of times the variable has to be differenced (screened) to arrive at a stationary. This could form the strategy and reduce (if not eliminate) the risk of spurious regression, Engel and Granger (1987) and Granger and Newbold (1974). Usually the unit root test (using first or series of orders of differencing) fringes the variable to stationary. A time series is stationary if its means, variance and auto-variance are not time- dependent. The ADF (1981) unit root test was applied. The assumption is that the time series used for this research have unit root stochastic process represented as follows:

$$\Delta Yt = \beta 0 + \beta 1t + \lambda Yt\text{-}1 + \ldots \sum_{i=1}^{m} \acute{\alpha} i\, \Delta Yt - i + \lambda\, t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

where Yt represents each single time series (GDP, FDIn, CRP, GCE, Yn, SAR and INF.) under investigation and β the parameter coefficient, ℷ t is a pure white noise error term, άi and ℷ are coefficients of the lag terms and m is the length of the lag terms which is automatically selected using Akaike information criteria. If 'ℷ' is 0, then there is unit root, but if it is less than zero (negative), the null hypothesis is rejected and the alternative that the series is stationary is accepted.

Co-integration Test

Capitalizing on the likelihood of the co-movement in their behavior which implies that there is possibility that they trend together towards stable long run equilibrium, Johansen (1991) Co-integration test was applied. The objective of this test is to determine if there is existence of long-run equilibrium relationships among variables used in this research. The concept of co-integration creates a link between integrated process and the concept of steady state of equilibrium as pointed out by Engle and Granger (1987), Co-integration occurs when two or more time series variables which may be non-stationary, drift together at roughly the same time. This implies that a linear combination of the variables is stationary. The null hypothesis is that the variables are not co-integrated. Based on this, we specify the full information maximum likelihood based on the vector autoregressive equation (VAR) Johansen (1991) [], as mathematically stated below:

$$y_t = a_1 y_{t-1} + \ \ldots + a_k y_{t-k} + \Delta x_t + \ \mu_t \ \ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

where: yt is a k-vector of 'differenced' stationary time series, 'k' being the lag length for the first order differenced variables, /(1), 'xt' is a vector of deterministic variables, 'a' is a constant, ø are the coefficients of the deterministic variables and μ_t *is a vector of innovations or error term and it is known as the adjustment parameters in the vector error correction model, while "t" indicates time dependent. Using this method we estimated the equation in an unrestricted form and then tested whether we can reject the restriction implied by the residual rank of the co-integration. Applying the maximal non-zero eigen -values and the trace test of the maximum likelihood ratio, with reference to the level of significance, the number of co-integration relations could be determined which indicate the existence of long run relationship Johansen 1991.[]*

Error Correction Model

However, Co-integration process ignores the short run dynamics that might cause a relation not to hold in the short run and this formed the basis for application of Error Correction Mechanism (ECM). This is an extension of the partial adjustment model in co-integration technique which is the traditional approach to modeling of short run dynamics with long run equilibrium. It thus preserves the long run relationship while specifying the system in a short run dynamic way, Granger and Newbold (1977) [12], and Engel and Granger (1987) [8] are among the studies that have proved that a co-integration is a sufficient condition to run an ECM process.

A vector error correction model is a restricted VAR (Vector auto- regression) that has co-integration restriction built into the specification so that it is designed for use with non-stationary series that are identified to be co-integrated. The co-integration residual term is known as the error correction term here, since the deviation from the long equilibrium is corrected gradually through series of partial short-adjustment, Gujarat and Porters (2009) [].
A search for parsimony in this dynamic model typically follows the general–to-specific modeling (using various information criteria (Akaike, Schwarz, log likelihood, etc) which minimizes the possibility of estimating relationship while retaining long-run information, if the variables do not have the same order of integration, (Engel and Granger (1987) [8]. The functional form of the model, which initially is presented in a general form, incorporating many lag terms, is therefore later reduced to a specific or parsimonious structure by empirical testing and elimination and this gives the final and more precise result of the estimation.

Based on this, the specification is re-parameterize in a dynamic process and OLS regression is applied with the equation as shown below:

$$\Delta GDP_t = a_o + \sum_{i=1} a_i GDP_{t-1} + \sum_{i=0} a_i Z_{t-1} + ai\ ecmt\text{-}1 + t \quad \text{.....(3)}$$

Where a_o is a constant, GDP_t is a vector of endogenous and the dependent variable, Δ, is a change in GDP, Zi is a vector of explanatory variables (investment indicators)and $a_i$is the parameter coefficients, GDP_{t-1} is the lag term of the dependent variable, the ecmt-1 which is the error correction term, is the residuals from the long-run co-integration process and its coefficient measures the speed of the adjustment of the disequilibrium while $_t$ is the white noise.

As long as the co-integrating vector (ECM) ecm_{t-1} is stationary and well defined, (negative), the ECM estimation will then confirm the earlier proposition that the variables are co-integrated or stationary. Equations 3, constitutes the maintained hypotheses for the ECM specification search. The insignificant or redundant variables are usually omitted at the parsimonious stage using Akaike Information Criteria and Schwartz Criteria. Finally, diagnostic tests are performed on the results with a view to validating the models.

Model Specification
In specifying the relationship between private sector investment (non-oil)and economic growth in Nigeria, we applied the newer endogenous growth theory framework already discussed. It is assumed that increase in the availability of financial resources will lead to higher level of investment and ultimately economic growth while inflation is regarded as a constraint. Credit to private sector, Government capital expenditure and Savings ratio are proxies for capital or financial resources. Foreign direct investment (non-oil) and Non-oil GDP are major proxies for private investment, while Gross capital formation is proxy for total investment. These investment indicators are the explanatory variables while economic growth proxies by Gross Domestic Product (GDP) are the dependent variable.

We also assumed that private investors could (and regularly do)exercise the option to wait in investment decisions when the macro economy is too volatile to accommodate their investment. Consequently, the significant of risk through macro-instability (inflation) is not only because it influences the investment decision but it also affects how much to save and thus contributes to low savings rate and capital flight. Secondly the degree of distortion reduces the propensity to invest and hence potential output.

Leaning on the endogenous growth theory, the functional and linear mathematical relationships of our model are specified as follows:
GDPt = *f*(CRP, GCE, Yn, ,FDIn,, GCF, Inf., SR, μt .....(4)

ΔlGDPt = β0 - lnβ1CRPt + lnβ2GCEt – β3Ynt – β4FDInt + β5GCFt + β6SRt -β7Inf.t +μt..(5)where:
GDP = Economic growth
GCE = Government capital expenditure
CRP = Credit to private sector (non oil)
Ynt= IncomeOut put (non oil)
FDIn = Foreign direct investment (non-oil)
Inf.= Annual Inflation rate
GCF = Gross Capital Formation
SAR =National Savings as ratio of GDP
Ut= Error term

Economic growth (GDP) which is the dependent variable is thus specified as a function of non oil private sector investment indicators which are the explanatory variables.
Theoretical priori expectation: β1, β2a, β3,β4 , β5 and β6> 0, : β7<0.<or> 0.

Hence the above estimable long-run linear equation 5 posits that a change in economic growth in Nigeria is a function of the selected explanatory or investment indicator variables where, 't' indicates time- dependence and 'μt' is an unobservable component that is assumed "white noise" while 'ln' represents logarithmic expression used to make the calculation less tedious.

Data Presentation and Analysis
This section presents the data, the empirical results and discussions on the relevant findings from the model specifications tested in this research. Table 4.1 below shows the summary of empirical result when OLS multiple regression is run at the level.

Table 4.1
Long-run OLS Regression (Variables measured at Level)Data Presentation

lnGDP = f(INF., SAR, lnFDIn, lnGCE, lnCRP, lnGCF,lnYn
Dependent Variable: lnGDP

Method: Least Squares

Date: 06/13/2015 Time: 09:03

Sample(adjusted): 1981 2013

Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF.	-0.332548	0.080039	-4.154837	0.0001*
SAR	-0.038213	0.046321	-0.824960.	0.4306
lnFDIn	0.029686	0.008057	3.684720	0.0004*
lnGCE	-0.530898	0.187050	-2.838265	0.0056*
lnCRPn	-0.346218	0.102670	-3.372159	0.0011*
ln GCF	0.024264	0..028542	0.850011	0.4012
lnYn	0.025741	0.025091	1.025884	0.3077
C	2.005662 .	0.488623	4.104722	0.0000
R-squared	0.722742	Mean dependent var		12.81635
Adjusted R-squared	0.685452	S.D. dependent var		2.180313
S.E. of regression	0.215864	Akaike info criterion		0.001534
Sum squared resid	0.878374	Schwarz criterion		0.376722
Log likelihood	8.882113	F-statistic		205.0764
Durbin-Watson stat	1.087723	Prob(F-statistic)		0.000000

Source: E-View Econometric Computer Software Application, Version 6

Analysis OLS Level Series Result

The Ordinary Least Square level series result as presented on table 4.1 above, shows that the coefficient of determination (R-square (0.72) is 'a good fit' indicating that 72 per cent of the variations in economic growth (GDP) are determined by the combined effect of changes in the explanatory variables(investment indicators).The F-statistics (205.07) confirms further that the explanatory variables are jointly and statistically important in explaining the variations in the economic growth process. The selected explanatory variables are rightly signed in accordance with the priori expectations except Government Capital Expenditure

(GCE), credit to private sector and savings which have negative signs. Non-oil foreign direct investment has positive relationship while non-oil income output (Yn) and Gross capital formation, though positive, have weak influence on growth. Credit to private sector non-oil, inflation and government capital expenditure, by implication, have significant negative impact on GDP. High inflation rate constitutes risk and therefore a constraint to the benefits derivable from non-oil investment in Nigeria. Savings/GDP ratio has negative sign and is not significant. This confirms that Nigeria is a low savings economy due to low income, abject poverty and capital flight by most wealthy Nigerians that prefer to maintain bank accounts outside the country.

However, despite these results, a cursory look at the diagnostics tests suggest possible spurious regression (low Durbin Watson DW- statistics (1.087) and very high coefficient of determination, R-squared (74.2) which implies time-dependency of these variables at this level. There was need for more rigorous tests which justified looking at the inherent properties of these time series data by testing for stationarity or otherwise. The variables were therefore re-examined using the Augmented Dickey Fuller (ADF) (1981) unit root test..

Table 4.2
Summary of Unit Root Test Result Data Presentation

Variables	At Level		First Order Difference		Remarks
	ADF Test Stat	Order of Integration	ADF Test Stat	Order of Integration	
(INF)	-2.187927	-	-3.226143	/ (1)	**
ln(GDP)	-1.860782	-	-3.999801	/ (1)	***
lnYn	-2.451152	-	-3.378241	/ (1)	**
ln(CRP)	-2.254731	-	-4.170888	/ (1)	***
ln(GCE)	-2.118511	-	-6.966956	/(1)	***
ln(GCF)	-2.259895	-	-5.900253	/ (1)	***
Ln(FDIn)	-1.902123	-	-4.205172	/(1)	***
(SAR)	-2.259895	-	-5.900253	/(1)	***
Note:	Critical Value: 1% = -3.6852 5% = -2.9705 10% = -2.6242		Critical Value: 1% = -3.6959 5% = -2.9750 10% = -2.6265		

* = 10% level of Significance ** = 5 % level of significance
*** = 1 % level of significance .
Source: E-VIEW Econometric Computer Software application, Version 6

Analysis of Unit Root Test Results

In view of the suspected time-dependent feature of the data used for this research as shown on table 4.1, the ADF unit root test was applied separately on all the variables (investment indicators and GDP) at ordinary and first order levels of differencing. The objective of this test is to establish whether the time series have a stationary trend. The summary of the unit root test results as presented on Table 4.2 below shows that the null hypothesis of non-stationarity is accepted, implying that the variables are not stationary at level but could only be rejected after the first order /(1) differencing, (ie they became stationary after first order differencing) for all the selected variables at one and 5 per cent levels of significance. This is evidenced by ADF test result at the ordinary level, which shows that the computed negative ADF test statistics for each variable is less than the Mackinnon critical values (Mackinnon, (1991), in absolute term.

TABLE 4.3
Summary of Johansen Co-integration Test Results Data Presentation

Sample: 1982-2013
Included observations: 32
Test Assumptio n: linear deterministic Trend in the data
Series: ln GDP, (ln CRP, ln GCE „ln GCF, ln FDIn, lnYn, INF.)
Lags interval: 1 to 1

Eigen- Value	Likelihood Ratio	5% Critical value	1% Critical value	Hypothesized No of CE (s)
0.937152	301.6105	118.22	123.48	None**
0.906051	202.2111	93.05	102.16	At most 1**
0.874464	188.6472	66.42	74.57	At most 2**
0.801683	130.0825	45.41	53.57	At most 3**
0.635731	43.18166	28.75	34.54	At most 4**
0.278103	11.06115	14.21	19.16	At most 5
0.012488	0.423144	3.57	6.46	At most 6

*(**) denotes rejection of the hypothesis at 5%(1%) significance level
L.R. test indicates 5 co-integrating equation(s) at 5% significance level

Source: E-View Econometric Computer Software application, (Version 6)

Analysis of Co-integration Tests Results

The objective of this test is to determine if there is existence of long-run equilibrium relationships among variables used in this research. The summary of the results as presented on tables 4.3 above shows that there are five (5) co-integration relations at 5 per cent level of significance. This implies that the test statistics rejected the null hypothesis which states that the variables are not co-integrated and accepted the alternative, implying that there is long-run relationship among the selected investment indicator variables and

the economic growth. Savings ratio variable was dropped because it was very insignificant.
Series:lnGDP = f(lnCRP, lnGCE,,lnYn, lnGCF,Inf., lnFDIn

Table 4.4: Parsimonious Error Correction Model Data Presentation

Dependent Variable: DLn GDP
Method: Least Squares
Date: 06/13/2015 Time: 11:24
Sample (adjusted): 1982 2013
Included observation: 32 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.010042	0.299051	-6.721402	0.0001
Dln(GDP(-1))	0.404245	0.261621	1.545155	0.1352
Dln(GDP(-2))	0.094872	0.033489	2.832930	0.0071*
Dln(INF)	1.484532	0.108670	0.915422	0.3611
Dln(INF(-2))	-0.060011	0.014447	- 4.153872	0.0004*
Dln(CRP)	- 1.097115	0.921464	-1.190621	0.2153
Dln(CRP(-1))	-0.246828	0.091030	-2.711508	0. 0080*
Dln(GCF(-2))	-0.002986	0.001221	- 2.445536	0.0088*
Dln(FDIRn(-2))	0.038432	0.01312	2.929115	0.0068*
Dln(GCEI(-2))	-0.047371	0.01132	- 4.184628	0.0003*
Dln(Yn-2))	- 0.035632	0.01112	3.204136	0.0017*
ECM02(-1)	-0.153489	0.055848	-2.748341	0.0081*

R-squared	0.660231	mean dependent var	0.04311
Adjusted R-squared	0.625462	S.D dependent var	0.201003
S.E of regression	0.200222	Akaike info criterion	-2.20222
Sum squared resid	0.702378	Schwarz criterion	0.11231
Log likelihood	-14.43534	F-statistic	12.616022
Durbin-Watson stat	2.31223	Prob(F-statistic	0.00019

Source: E-View econometric computer software application, Version 6

Analysis of ECM Result

The parsimonious error correction mechanism(ECM) result presented in table 4.4 below gives the final and more improved estimation result when compared with the OLS level series model. All the selected investment indicators are correctly signed except Government capital expenditure and credit to private sector which were negative, implying negative influence on economic growth. The F- statistics ratio of 12.6is high, indicating that the variables are collectively important contributors to variations in Nigeria's GDP. The coefficient of determination ((R^2)) implies that 66 per cent of variations in GDPis determined

in aggregate, by the changes in these selected explanatory variables (investment indicators) in the long run. Durbin-Watson statistics of 2.3 also strongly suggests absence of auto-correlation, implying that the unit root test has been effective in screening the variables to become stationary. The estimation also confirmed that inflation as a risk was an important factor in non-oil investment decision. The lag of the dependent variable (GDP) was equally significant in the determination of economic growth. The impact reflected inter-temporal dependence of GDP with the level of GDP at any one period, determining the level in another. The coefficient of the ECM term which measures the speed of the adjustment at which equilibrium is restored, (-0.15) is significant and rightly signed (negative) at 5 percent level, and therefore confirms our earlier proposition that the variables are co-integrated that is, there is long run relationship. The speed also suggests that in the long-run, GDP in Nigeria adjusts slowly to disequilibrium changes in the explanatory variables since only 15 per cent of the accumulated disequilibrium in GDP is corrected within 2 lags (one year is a lag in this study).

In addition, foreign direct investment result indicates positive exposure of the domestic economy to the external sector while the credit to private sector negative relations implies inadequate disbursement of loanable funds by banking system to private sector and possible crowding-out effect by public sector credit or access to funds thus, resulting to reduced production capacity. This confirms that quality, cost and availability of loadable funds have been a constraint to the expansion of private investment in Nigeria. Nnanna, et al (2004).

The sub-optimal performance of Gross capital formation could be traced to many factors including persistent inflationary pressures, low level of domestic savings, low of level of credit to private sector, inadequate physical and social infrastructure, fiscal and monetary policy slippages, and low level of indigenous technology as well as political instability. The complementarily of government capital expenditure could not be established as the variable is insignificant and wrongly signed (negative) and so implies that no positive impact could be made on GDP.

Finally, macroeconomic instability (inflation) is quite undesirable and its result shows adverse effect on growth. Stability shapes the overall investment climate and determines the degree of confidence investors have in an economy. It aids planning and enables investors plan and forecast reasonably future returns on current investment. These results lend support to recent studies by Nnanna et al (2004).

Conclusion

Nigeria's vast natural mineral resources, favorable climate and vegetation have a very good potential to attract both domestic and foreign private investment to boost sustainable economic growth. This study examined the relationship between some selected Non-oil private investment indicators and economic growth in Nigeria, from 1980 to 2013. The study brought to fore that private sector investment (non-oil) has not been significantly transformed as anticipated by the adopted policy strategies. It still requires a radical structural transformation, good economic policies, and inculcation of adequate savings habit and development of technological efficiency to boost private investment. This will boost manufacturing capacity utilization for rapid economic growth and development as

well as generating export earnings that will even exceed current revenue from crude oil, with the current glut in oil prices.

Recommendations

Based on the analysis of the findings, the study recommends that:

1. Monetary authorities should strive to achieve sustainable price stability, economic efficiency driven by infrastructural development and enhanced technological capabilities to boost private sector production capacity.
2. Maintenance of fiscal discipline by channeling adequate capital expenditure to the productive sector of the economy and increase in the amount of credit to the private sector investment (non oil) should also be highly emphasized.
3. The current industrial strategy should focus on promoting the growth of Small and Medium Scale enterprises which are the main engine growth of the economy. Additionally, increase in local production of, and value added to primary commodities and manufactured products should be encouraged. This will curtail excessive foreign exchange demand for importation of goods.
4. Stable polity and sustainable economic reforms should be increased to promote more domestic foreign investments.
5. Finally, there is need for the policy makers to take cognizance of the lag effect and design policies in line with the expected magnitude of expected changes.

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Table 3.1. Data Description and Measurement used for the Model

S/N	Notation	Variables	Unit	Key Data Characteristics	Source of Data	Method of Generation
1.	CRG	Credit to Government	Million Naira	Stock variable	CBN	Reported
2.	INV	Investment	Million Naira	Flow variable	NBS	Proxy is GFCF. Annual INV is disaggregated using 'quadratic match sum' procedure on E-view
3.	PINVn	Private Sector Investment (Non-oil)	Million Naira	Flow variable	NBS	PINVn = INV– PINVo where PINVo is Oil sector investment
4.	GCE	Government Capital Expenditure	Million Naira	Flow variable	CBN	Reported
5.	INF.	Annual Inflation Rate	Per cent		CNB	Reported
6.	FDIn	Foreign Direct Investment (Non-oil)	Million Naira	Stock variable	CBN and NBS	FDIn = FDI – FDIo where FDIo is FDI for oil sector
7	INVo	Investment in Oil Sector	Million Naira	Flow variable	NBS	1st: Annual INVo is derived as a proportion of INV using percentage contribution of oil sector value added in output. 2nd: Annual INVo is disaggregated using 'quadratic match sum' procedure on E-views

8.	NFXR	Nominal Foreign Exchange Rate	N/USD 1.00.		CBN	Reported
9.	DMLR	Domestic Maximum Lending Rate	Per cent		CBN	Reported
10.	RGDPn	Real Gross Domestic Production (Non-oil)	Million Naira	NBS	Flow variable	RGDPn = RGDP – RGDPo. where RGDPo is Oil sector RGDP